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ABSTRACT

Comprehensive or nonselective schools have been in existence in the United Kingdom for over 40 years, having gradually replaced the old selective system of grammar schools for able pupils and secondary modern schools for less able pupils. In spite of their growth in numbers, comprehensive schools have been subject to continual controversy, and current government policies favor a return to forms of pupil selection and differentiation. This paper therefore begins with a review of the history of comprehensive schooling and the rationale for its adoption, and then assesses existing research into the effectiveness of selective and nonselective systems. The third section evaluates some of the effects of comprehensive schools on their pupils by examining an "experiment of nature" that occurred when a community in Wales partially reorganized its schools, leaving a third of its pupils in a selective system and putting two-thirds into new nonselective comprehensive schools. A wide range of data were collected on the pupils entering the two systems, including personality characteristics, verbal ability, mathematical ability, and nonverbal ability or intelligence. Findings are tabulated and discussed for (1) cohort intake data for selective and comprehensive systems; (2) actual and predicted outcome scores for the two systems; (3) residuals and standard deviations; (4) catchment areas of the two systems; and (5) outcome results by ability groupings. Results indicate that the significantly poorer academic and social performance of comprehensive schools is largely due to poor results with the middle third of the ability range who in the selective system attended the top streams of the secondary modern schools. A bibliography is included. (TE)

THE EFFECTIVENESS OF SELECTIVE AND NON SELECTIVE SCHOOLS:

AN EXPERIMENT OF

NATURE

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Introduction

Comprehensive or non-selective schools have been in existence in the United Kingdom for over forty years. At present they educate over 90% of those children who attend State secondary schools and they have gradually replaced the old selective system of grammar schools for able pupils and secondary modern schools for less able pupils as the dominant form of educational provision.

In spite of their growth in numbers, though, the schools have been the subject of continual controversy since their inception. Current governmental policies in the United Kingdom are in fact to bring back forms of pupil selection and differentiation into separate schools or into different educational streams within a school. At the same time, countries outside the United Kingdom are also debating the wisdom of moving towards a more differentiated system and away from a common school system (as in the case of the United States) or of moving towards a comprehensive school system from a selective one (as in parts of West Germany).

This paper aims to evaluate some of the effects of comprehensive schools upon their pupils by means of examining an experiment of nature which occurred when a British community partially reorganised its schools, leaving a third of its pupils in a selective system and putting two-thirds into new non-selective comprehensive schools. Because of the homogeneity of the community, both systems received virtually identical groups of pupils at intake and data was collected on their academic and social progress within the two systems, together with the internal school organisation and processes that they encountered in the two different systems. The paper also attempts to relate this work to the more general recent literature about school effectiveness and school effects. It is based on a fuller treatment that is available elsewhere (Reynolds, Sullivan and Murgatroyd, 1987).

The History of Comprehensive Schooling and Explanations for Its Adoption

There is insufficient space to permit here any detailed discussion of the history of comprehensive schooling in the United Kingdom - such treatments are also available elsewhere (Reynolds et al, 1987; Rubenstein and Simon, 1973; Simon, 1974). Suffice to say that the movement for the

school developed out of severe dissatisfaction with the operation of the selective system of education after this was set up in the 1944 Education Act.

The Act itself had implicitly encouraged selective education in its wording that:

> *The schools available for an area shall not be deemed sufficient unless they afford for all pupils opportunities for education offering such variety of instruction and training as may be desirable in view of their different ages, abilities and aptitudes...*

and the philosophy of the Act clearly reflected the philosophy of various governmental committees that there were different types of child with different qualities of mind and intelligence who required different types of school. Although certain local authorities developed comprehensive schools for economic reasons (where existing separate schools were too small, for example), it took a variety of dissatisfactions with the selective system to generate movement in school organisation at a local level:

(i) Sociological research (e.g. Halsey, 1953 and Floud, 1957) showed a wastage of ability, particularly of working class children;

(ii) Psychologists questioned the extent to which the selection procedures at age eleven had accuracy or predictive reliability;

(iii) Expansion of pupil numbers (because of the post-war baby boom) closed off high status selective 'grammar' schools from many middle class parents whose children had customarily attended them, generating a desire for a comprehensive alternative.

In 1965, the Labour Government legislated for the introduction of unified secondary comprehensive education for pupils of all abilities, either in 'all through' age eleven to eighteen schools or in other alternative systems.

Between 1966 and 1970, when the Labour Government lost office, the proportion of secondary age pupils at comprehensive schools went up from 12% to 40%, yet the arrival of a Conservative Government in 1970 in which Margaret Thatcher withdrew Circular 10/65 and replaced it with Circular 10/70,

thereby removing central government backing for comprehensivisation, saw no slackening of the rate of growth of the comprehensive sector. By 1973, 50% of all secondary pupils were in such schools and the return of a Labour Government in 1974 generated Circular 4/74 which revived overt Government backing for comprehensives of two types - 11-18 all through schools and the tiered schools, where all pupils transferred at 13 or 14 from 'junior' secondary to 'senior' secondary schools.

The subsequent 1976 Education Act's introduction of compulsion through its prohibition that no maintained schools were to select with regard to ability or aptitude seems in most accounts (e.g. Bellaby, 1976) to have had remarkably little effect in further speeding what was already a very rapid growth in the comprehensive sector - by 1977, 80% of pupils were in such schools.

However, the advent of the new Conservative Government in 1979 seems to have slowed further progress. The 1976 Education Act was itself repealed in 1979, although the High Court and the Court of Appeal's decision in 1976 that Tameside L.E.A (which wanted to reintroduce selection) was not acting 'unreasonably' in the 1976 Act's meaning of the term had already made the Act itself of doubtful usefulness or strength. The appointment of Sir Keith Joseph as Education Minister in 1981 brought, as Shaw (1983) somewhat dramatically notes, "the first minister who appears positively hostile to comprehensive schooling since Margaret Thatcher" and Joseph's ideology appeared to be reflected in an increased unwillingness to approve L.E.A. comprehensivisation plans where these threatened established grammar schools of good reputation or where vocal support was raised against them.

Since Joseph rejected only nineteen out of seventy-three L.E.A. plans (Hansard, 8.7.1986), the small growth in the comprehensive sector from 80% of pupils in 1977 to only 84% of pupils in 1983 seems likely to reflect changing levels of enthusiasm for the schools at L.E.A. level. Given the historically decentralised nature of the British educational system (James, 1980; Reynolds, 1984), local government has possessed considerable autonomy in its choice of organisational structures and it seems likely that public expressions of concern about comprehensive school academic standards by Boyson, Joseph and others on the 'radical right' of the Conservative Party may have had both direct effects on L.E.A. opinion and indirect effects

mediated through a mobilisation of middle class voters that have combined to slow the move from selective education.

In some L.E.A's already gone comprehensive, in fact, there have been proposals to reintroduce some form of selection, such as the 'super grammar' schools proposed for Hereford and Worcestershire and for Solihull. In Redbridge L.E.A. and in Cheltenham, by contrast, proposals have merely been to re-establish the traditional twenty per cent of pupils in selective schools. Although the Solihull proposals were abandoned and, at the time of writing, those of the other L.E.A's seem unlikely to go forward, the sudden flurry of schemes to reintroduce the selective system perhaps stands to illustrate the tenuous hold that the comprehensive system has attained. Although Benn and Simon (1970) felt able to argue that "comprehensive education is now securely established in Britain" (p.347), it is the insecurity of the comprehensive enterprise which is now most striking.

Explanations for the introduction of the schools by the Labour Government are numerous (e.g. Maude, 1969; Flew, 1983; Simon, 1986). It seems that comprehensive schools were never seen by the Labour governments of the past as being 'egalitarian' institutions designed to equalise outcomes as between different children. As other commentators have noted (e.g. Marsden, 1971), the Labour Party has always adopted a 'weak' definition of comprehensive education that simply saw it as a more efficient and effective institution for generating children with unequal qualifications. A number of factors seem to have predisposed the party to adopt comprehensivisation - the research evidence on wastage of ability in the selective system, combined with the influence of social democratic thinking, led to a desire to improve mechanisms of selection of pupils to increase equality of opportunity. Socialism's concern in the 1960's with the harnessing of science to generate wealth led to a concern to generate more talent and ability from amongst Britain's children. A concern for a more unified, harmonious social system led to desire for a more unified schooling system.

Whilst these factors predisposed governmental action, what seems to have precipitated that action was the political appeal of a comprehensive school policy, particularly one that could portray the new schools as giving to all the opportunities and traditions that had formerly been restricted

to a few. Dissatisfaction with the secondary modern school could be assuaged, yet the high status of 'grammar school' education could be retained and expanded through the ability range, as the tradition was handed on to pupils formerly denied it.

The Effectiveness of Selective and Non-Selective Systems - The Existing Research

The criteria of 'effectiveness' by which the comprehensive system should be judged seem, in the views of its proponents, to be threefold:

(i) A success of the comprehensive system in generating more academic attainment especially in scientific and technological subjects (i.e. more talent);

(ii) A success of the comprehensive system in aiding the growth of a meritocratic society in which ability rather than social class became a more powerful determinant of academic attainment (i.e. equality of opportunity).

(iii) A success of the comprehensive system in facilitating the social mixing of children of different social classes, the breakdown of pupil perceptions of the social class structure as rigid and the replacement of such perceptions by perceptions of the wider society as flexible and hierarchical (i.e. more 'communality' in pupil attitudes).

Evaluating whether the comprehensive system has attained those linked goals is a difficult exercise. Firstly, what seems most surprising is the relative paucity of the overall effort that has gone into research on this question. By comparison with research into topics such as classroom behaviour, school effectiveness or pupil/teacher interaction, Derrick (1980, p.342) notes aptly that "the evidence of widespread and increasing indifference or inability of researchers or of research funding agencies to pursue the comprehensive/selective topic is surprising". Whilst the sheer difficulty of research in this area, the possible commitment of researchers to the comprehensive system and the difficulty of gaining research access may be contributory factors, the full explanation for this state of ignorance is unclear.

Overall the early research can tell us very little about the effectiveness of comprehensive schools. Looking first at academic attainment, comparisons of reading and arithmetical standards over time are

difficult to relate to comprehensivisation, given the myriad of other social factors that may also have generated these changes. Expansion in the proportion of pupils getting 'O' levels and C.S.E.'s may, as Heath (1984, p.123) notes, "have taken place in comprehensive schools but we cannot conclude that they happened because of comprehensive reorganisation" (author's italics). Comparisons of the two system's academic performance at a point in time seem singularly equivocal - those studies showing a selective system advantage seem to be comparing that system with heavily creamed comprehensives. On social development, whether the slight rise in official truancy or the rise in delinquency is due to comprehensivisation is again impossible to say. Studies on social attitudes, social mixing and equality of opportunity seem, on balance, to show minimal differences between the two systems at the same point in time.

This early research conducted between the 1960's and the late 1970's in Britain has recently been supplemented by further research into this topic.

Perhaps the most scientific attempt to assess the effects of the comprehensive system lies in the data collected by the National Children's Bureau (N.C.B.) in its long-term cohort study of the progress of 16,000 young people born in one week of 1958 (Steedman, 1980). Information was specifically obtained on the characteristics of the sample at age eleven on entry to the different types of school - grammars, secondary moderns and comprehensives - and information was further obtained on a wide range of academic and social outcomes at age sixteen as the sample left school. After controlling statistically for variations in the ability and social composition of the intakes into the different systems of education (the comprehensives actually had intakes little different from those of the secondary modern schools as the former were heavily creamed), there seemed to be little difference in the results of the selective and comprehensive systems. In terms of mathematics and reading comprehension, the lower ability children seemed to progress at a similar pace in the two systems, though the very low ability child may have been slightly better off in the comprehensives. The very able child also seemed unaffected - or affected equally - by the two systems. Although there were hints of increased social class mobility in the comprehensives, on some of the social or

affective outcomes, comprehensives underperformed the selective system - truancy rates were higher, teachers perceived a higher proportion as having disturbance of personality or behaviour and the parents of comprehensive school pupils tended to be less satisfied with their children's schools. On the other more 'academic' outcomes of a pupil desire to stay on and pupil attitudes to later study, the comprehensives did slightly better than the selective system. Overall, though, comprehensives did as well as the selectives.

The information on the public examination attainments of the sample at sixteen (Steedman, 1983) was published some two years after the above findings and presents a very similar picture of minimal differences between the two systems. When grammar and secondary modern school pupils were treated as a 'selective' system, once differences in intake had been controlled for there was no difference in the proportions gaining no examination passes; in the average number of 'O' level equivalents or the proportion getting five or more passes; in the proportion attaining an 'O' level equivalent pass in Maths. and English; in the average number of 'A' levels obtained and in the grades obtained. Whilst there were slight differences between the three types of comprehensives described in the study (the 'transitional' comprehensives did particularly badly whilst the 'early' and 'recent' schools did better), overall the National Children's Bureau summarised its findings as showing that "after correcting for differences in initial attainment and background before secondary school, comprehensive pupils at this time (1974) were neither failing to match nor surpassing the examination performance of the selective pupils" (Fogelman and Holder, 1983, p.9).

Another recent attempt to assess the effectiveness of comprehensive reorganisation was provided by analysis of data at the Scottish Education Data Archive, collected through a series of national surveys of Scottish school leavers (Gray, McPherson and Raffe, 1983). There are of course substantial differences in the history, past mode of functioning and present organisation of the Scottish education system by comparison with England and Wales - one study, for example, shows Scottish children moving from above average reading ability at seven to below average attainment at sixteen (Fogelman, 1983) and Tibbenham (1983) cautions that "the outstanding feature to emerge is the difference between the situation in Scottish comprehensives

and that in the rest of Britain". It is also important to remember as the authors themselves note that their data cover the early years of comprehensive reorganisation and define as comprehensive only the sixty-nine 'common' schools which were completely uncreamed by the selective system or by any 'rogue' remaining super-selective schools. These schools seem to have been situated in socially unusual areas, which may explain their apparent success.

These researchers' results are generally more favourable to the comprehensive system than are most of the earlier studies. In the 'affective' areas of truancy, satisfaction with school and levels of corporal punishment (included as a surrogate measure for behaviour), there were no appreciable differences between systems. Academic attainment - levels were slightly higher in comprehensives: - fewer pupils left with no qualifications and rather more left with three or more 'Higher' passes. Class inequality in attainment was also slightly reduced in the comprehensives but this seems again to be in part a reflection of the historical tradition of the areas where the unusual uncreamed comprehensives were situated.

A further series of studies have been published by Cox and Marks (1983, 1985, 1986). The 1983 study shows variation in examination results between LEA's of similar social class composition (a factor of up to two) and between some schools within LEA's (a factor of up to four). They also find that the selective system obtains better results than comprehensives (30-40% more 'O' level examination passes per pupil). Using a data base of the 1981 examination results and census data on a number of social variables, the authors used data from 54 out of 96 English LEA's in an attempt to support their belief that a return to selective education would improve examination attainments.

In the report's favour, it has a large data base, recent data and also explicitly attempts to 'control' for the effect of background environmental factors on the two systems' relative performances. There are however major flaws in the methodology of the study. Firstly, the LEA's the study uses are unrepresentative in that they contain all selective LEA's but less than one-third of fully comprehensive ones. Secondly, only one background variable is used to attempt to statistically 'neutralise' the effects

generated by the comprehensive LEA's more disadvantaged socio-economic structure - the variable of the proportion of the population in low social classes - yet we have other recent evidence (Department of Education and Science, 1983; Gray, Jesson and Jones, 1984) that additional variables would have added considerably to the proportion of variance in examination performance explained. Adding the variable ethnicity to a social class variable increased the amount of variance explained in staying on at school rates by 10%, whilst other variables on housing conditions, unemployment, free school meal rates, etc., added about 3% more (DES, 1983). In the Gray, Jesson and Jones (1984) study, the proportion of children living in low social class households explains 58.1% of the variation in the proportion of children attaining more than one 'O' level pass across 96 LEA's - adding other variables on the proportion in high social classes, children with parents born abroad and children living in one parent families increased this figure to 73.7%. Clearly, much of the apparent superiority of the selective system could be due to the study's intake variables explaining little variation in outcome and therefore explaining as due to school effects variation that is due to outside-school social and environmental factors (for further criticisms see Gray and Jones, 1983).

The second Cox and Marks study (1985) repeated many of the points of the earlier work. Using 57 LEA's, the 1982 examination results and other sources of data, the authors again argue that pupils at secondary modern and grammar schools together obtained more 'O' level passes than those at comprehensives - between 30% - 40% more per pupil when looked at nationally. When LEA's of similar social class grouping are compared on the basis of their comprehensiveness and 'selectivity', differences still favour the selective LEA's. Grammar schools overall do consistently well - more surprisingly, secondary modern schools do very well with results only marginally inferior to the comprehensives and with particularly good results in Maths. and English.

Many of the same criticisms that were levelled at the first study were applied, some with reduced applicability, to the second study (Gray, Jesson and Jones, 1985). There are again doubts as to whether the more socially disadvantaged LEA's which have comprehensive systems have had

this disadvantage taken account of, even though Cox and Marks added a measure on 'high social class' to add to the measure on low social class. If one takes all 'O' and CSE grades to measure the effectiveness of the two systems, then the percentage of pupils in grammar school in an L.E.A. (what is called the selectivity variable) makes no difference at all to the examination results in their own data set.

The third study from the National Council for Educational Standards (Cox and Marks, 1986) concentrates upon the schools and the results of the Inner London Education Authority. Their argument here concentrates on a comparison of the fully comprehensive ILEA system with selective systems elsewhere, a comparison which is alleged to show substantial ILEA underperformance. Critics have noted however (Stubbs and Mortimore, 1986) that the study took as its baseline examination statistics for 1981 and 1982, yet the 1981 cohort were the last intake into the old system of heavily creamed comprehensives. Doubt is also cast on the study's allowance for the high level of social disadvantage in London, a doubt which has been confirmed by the more elaborate statistical procedures used elsewhere (Department of Education and Science, 1984) which have revealed ILEA schools to be performing precisely at the levels one would predict from knowledge of the area's socio-economic structure.

The last two recent studies we consider here are those of Maughan and Rutter (1987) and the further findings of the re-analysed DES study (1984). Unfortunately for believers in the value of the comprehensive experiment, both these studies by independent researchers (which are in many ways some of the most scientific attempts yet to gain information on this question), have generated results unfavourable to comprehensive schooling. The Rutter study for example (Maughan and Rutter, 1987) draws upon data from the sample of children who furnished data for the Fifteen Thousand Hours study of school differences (Rutter et al, 1979). Taking similar children going into the two different systems and statistically controlling for the effects of any differences in intake into the systems, reading scores at age 14 were significantly higher in the selective grammar school sample by comparison with those children at comprehensive schools. Fifth year examination results - expressed in terms of 'points' scored for both CSE and 'O' levels - were also superior in the selective system, part of this being due to a higher entry rate in the grammar schools. When

account was taken of this, though, by looking at the examination 'points' per entry, the selective system's superiority was reduced. Differences in sixth form examination results also favoured the selective schools but again these differences were reduced (but not eliminated) after allowing for the selective schools higher entry rates.

The authors conclude their analysis with two points. They note that the selective schools overperformance seems largely to be a function of their intellectual 'balance', whereby all pupils seem to evoke high performance from each other. Comprehensive schools with an intake of similar ability to the grammar schools have only slightly lower examination attainments. Also, the authors note that some comprehensive schools can match the performance of the selective grammar schools. One school, with a relatively poor balance in its intake, succeeded because of its positive and cohesive ethos in bringing the attainments of both able and less able children up to their maximum. Overall, though, the authors' results can only be seen as reflecting relatively unfavourably upon the academic outcomes of comprehensive schooling in Inner London in the late 1970s.

The last study that we consider here is that conducted by the Statistics Branch of the Department of Education and Science (DES, 1984). Based on 96 English LEA's, the analysis attempts to use socio-economic data on each LEA to explain variation in their educational 'outcomes' in examination attainments. Socio-economic variables are very strongly associated with educational performance - for lower levels of examination attainment the social disadvantage factors were the most important influence on the amount of variation explained, whilst for higher levels of attainment the proportion of an LEA population in high socio-economic groups came into prominence. Several of the school based variables were found to have statistically significant associations with the attainment measures but of a small degree. These variables included teacher turnover, pupil teacher ratio and expenditure per head on education. Also - and most importantly for us here - the proportion of pupils in grammar schools in an LEA was associated with high 'A' level and 'O' level/CSE performance and was also associated with a low proportion of pupils leaving school with no graded result. Again, in this data set also, comprehensive schools appear to slightly underperform academically compared to the selective system.

The Experiment of Nature in 'Treliw'

We have been researching in the schools of our necessarily anonymous Welsh education authority for a number of years when the opportunity came to evaluate the relative effectiveness of the two systems of education in attaining their goals.

Our early work was into the secondary modern sector and concentrated upon a group of eight schools which exhibited very different levels of 'outcome' in terms of attendance, academic attainment and delinquency. Data collection across all eight schools of information on pupil background, pupil attitudes and school processes was undertaken and two of the schools were subject to an especially long period of attention taking a number of years, as we sought to understand the potentially causal role of school process and also generate further ideas for future work. This work is reported elsewhere (Reynolds, 1975, 1976). Five of these secondary modern schools and two grammar schools were combined to form two new comprehensives. In both cases, the base of the new school was the former selective grammar school, which functioned in both cases as the site for years 2-5 and for the schools' sixth forms. Both comprehensives employed a lower school - former selective secondary modern schools - to house their first years. Both headteachers of the grammar schools became the headteachers of the comprehensive schools. Both comprehensives were split site.

Because we had 'blanket tested' the entire communities' primary schools in order to gain information for our first study and simply because we wanted a baseline against which any educational changes could be assessed, we had data on the pupil intake into the two comprehensive schools and into the selective system of a grammar school and two secondary moderns situated elsewhere in Treliw. This information covered pupil reading ability on two tests (Daniels and Diack, 1974; Watts and Vernon, 1947), mathematical ability (Vernon, 1971), personality (Eysenck, 1965) and non-verbal ability (Raven, 1960). Pupils that we had tested went as only the second intake to the two comprehensives or to the selective system that continued its normal functioning for four more years until it too went comprehensive.

We must be honest to the reader about the disadvantages of utilising this data. Firstly, our early data collection was focussed upon boys, since we were initially concerned only with delinquency which was then in official

statistics an overwhelmingly male offence. This study mainly has data on the differences between the two systems in their effect upon boys.

Secondly, our range of data about each pupil is more restricted than we would have liked. Other studies have shown academic, personality and social/family factors as important predictors of school outcomes at fifteen (e.g. Davie et al, 1972; Douglas, 1968), yet we have of course no social or family data that is specific to each child. What we did have, though, was 1971 Census data on a large range of variables describing the catchment areas of the two systems. At a group level, then, we had a wide range of the social background data that we lacked at individual level and inspection of the two systems catchment area data shows such homogeneity that the absence of individual social data is unlikely to be a source of bias.

Thirdly, our selective system in Treliw is marked by an above average proportion of pupils getting grammar school places. Whereas nationally in the early to mid 1970's between 26% and 29% of pupils in the selective system went to grammar school (Gray, et al 1984), our cohort's proportion was over 41% (42 out of 101 pupils). This makes our study atypical in an important respect and - given that pupils at grammar school are likely to do better than similar pupils at secondary moderns - may bias our results unfairly in favour of the selective system.

Fourthly, we look in this study at the second ever intake into the comprehensive schools of our area, with the result that any problems or underperformance of the system may be attributable to either recency factors or to systemic factors that are a pure reflection of the systems novelty. Simply, the settling down of school organisations in their early years may produce a particularly unfavourable response to their clients' needs.

We must alert the reader then to the disadvantages of this particular research area and of our cohort in terms of scientific adequacy. In our defence, though, this study has a large number of strengths which in our view outweigh the potentially damaging effects of some of the above weaknesses. Ever since Campbell and Stanley (1963) wrote their classic treatise on experimental and quasi experimental research designs, many social scientists particularly in America have advocated the use of true experiments as sources of data on which to judge the effectiveness of different programme or policy alternatives (e.g. Kennedy, 1981; Gilbert and Mosteller, 1972). Ideally the experiment should involve the random assignment of individuals to a policy 'treatment', with the remainder of the sample getting either another policy or no policy at all, functioning as a control group to be compared on various policy outcomes with the 'treatment' group (e.g. Gilbert, Light and Mosteller, 1975). Such experiments although highly prevalent in medical science (see Cochrane, 1972), have been much rarer in social or educational research - local control of schools, the tendency of

policy reforms to spread quickly, professional unwillingness to permit evaluation and the lack (particularly in Britain) of those skilled in this research tradition have all been factors holding back development of this research methodology.

Approximations to experiments or what are known as 'quasi experiments' have become therefore something of a substitute for the real thing and as such have numerous enthusiasts (e.g. Cook and Campbell, 1975; Bronfennbrenner, 1979), some of whom view them as 'experiments of nature'. In this strategy, non randomly selected groups are the 'control' for the policy 'treatment', ideally similar on all the background variables which may affect the outcomes that are being assessed. If groups are not thus similar, analysis of covariance or other statistical techniques are used to equate statistically groups which are known to differ. Whilst making comparisons between groups may still be difficult if differences between groups on variables other than those covaried have a large effect, quasi experiments as Madaus, Airasian and Kellaghan (1980, p.56) note, "... endeavour to approximate a true experimental strategy, so that causal inferences about treatments may be made with confidence".

In this study, it is clear that ours is not a true experiment, with the random allocation of one group to comprehensives with the other selective school group as a control. Neither is it merely a quasi experiment, since it was ultimately a random or chance factor (the distance of the modern schools from the grammar school) which prevented the selective system from going comprehensive along with the other, more conveniently located, schools elsewhere in Treliw. Finances were simply not available for the new buildings that the selective system would have required to go comprehensive. Whatever the precise description of our research methodology may be, the chance treatment of one group of pupils in a different way to that of another group of identical pupils, both groups living in a ten mile area of the same community, is a research opportunity unknown within the research traditions established on comprehensivisation.

This experiment has numerous advantages over other studies that have attempted to assess comprehensive school effectiveness.

Firstly, it is of cohort design, so that the increment in each pupil's attainment and behaviour can be assessed, unlike cross sectional studies where different pupils represent the input and output in the different schools.

Secondly, our two systems took the full ability range from their catchment areas and were in no way creamed by surviving 'super grammar schools' as in many areas (see Gray, Jesson and Jones, 1984).

Thirdly, our two systems took from defined catchment areas with no system of parental choice of school being used, unlike many other areas where parental choice systems are often superimposed over a neighbourhood school catchment area policy (as in London). Since parental choice systems make comparisons of school systems extremely difficult (since schools of similar intake ability may still have parents of potentially very different 'interest' in proportion to whether they have specifically requested a particular school or simply been allocated it), we have no such problem in this research study.

Fourthly, our community itself was relatively homogeneous by comparison with other areas of more heterogeneous class structure. Our preliminary investigation of census data on the catchment areas of the two systems showed a virtually identical picture on social and environmental variables. As we shall see later, by the standards of all existing research we have schools of similar social backgrounds.

Fifthly, the education authority and the teacher's unions agreed to our request for research access and granted unusually free access to schools, subject to the agreement of the headteachers of the schools. No conditions were placed on our access, no vetting of research instruments was required and no modification to the research programme was required at any stage.

Sixthly, we were able to collect a range of data about the 'outcomes' from our schools that is unique in a study of this kind. Information on pupil reading ability, locus of control, attitudes to school and self conception was collected in the fourth year of schooling, and information on the examination results of the cohort was obtained in the fifth year. The attendance rates of different schools and the names of all members of the sample who became officially delinquent were also obtained. Information was obtained on a range of cognitive and affective or social outcomes, without the concentration on merely the cognitive that has marked much work in this area.

Seventhly, we were able to collect a wide range of data on the internal processes of our systems that is simply unique - indeed, studies of this issue have been notable for the absence of <u>any</u> process data on factors within schools that may be responsible for differential success (e.g. Gray, McPherson and Raffe, 1983).

The Effectiveness of Comprehensive and Selective Schooling

We noted earlier that we had collected a wide range of data on the intakes of pupils into the two systems, covering their personality, verbal ability, mathematical ability and non-verbal ability or intelligence.

These test scores were, we believed from our assessment of the research literature, good predictors of the social and academic outcomes of the schooling process and we therefore wanted to ensure that any variation in performance on the predictors by the intakes into the two systems should be taken into account before any comparison of the systems' effectiveness was made. Table 1 shows the two systems results in terms of the performance of their intake cohorts on these predictor variables:-

Table 1

Cohort Intake Data for Selective and Comprehensive Systems

	Selective		Comprehensive		T Value/significance level	
	Mean	S.D.	Mean	S.D.		
Extraversion	16.97	5.05	17.38	6.63	-0.63	n.s.
Neuroticism	13.48	5.69	13.20	4.83	0.47	n.s.
Reading A (D & D)	36.80	12.51	35.94	12.57	0.58	n.s.
Reading B (WV)	16.55	6.88	16.52	7.14	0.05	n.s.
Maths	23.85	10.72	21.98	10.29	1.50	n.s.
Intelligence	37.79	11.12	34.64	12.82	2.14	n.s.

It is clear from examination of these data that there are quite minimal differences in the mean intakes into the systems and in the distribution of pupil scores as measured by the standard deviations. Differences in the mean scores of the intakes into the two systems are only in evidence on the mathematics and intelligence tests, yet of course on these tests as well as on the others the standard deviation or spread of the scores in the samples shows that there is much greater variation within each system's sample of pupils than there is between the samples of the two systems. By comparison with all the existing research studies we reviewed we are in the scientifically enviable position of having a selective and comprehensive system with very similar intake characteristics in terms of the ability and personality of pupils.

Our outcome data was collected after our pupils had experienced four years of the two different systems. It included an indicator of academic attainment, the Edinburgh Reading Test measure of verbal ability, which we used as a surrogate for the examination results in public examinations that would have been available at the end of the fifth year of schooling. The test used was that appropriate for the age group in question (Stage Four, for ages twelve to sixteen) and was of established validity and reliability. Scores of individual pupils were age adjusted to generate what we call an 'E.R.T.' score and division of the raw, non age adjusted scores into the five sub-divisions reflecting different skill performances was also undertaken.

The non-cognitive or 'affective' or what some call social outcomes of schooling were measured in two respects. Firstly, two tests of pupil attitudes to school were given - the School Organisation Index (called by us 'Attitude to School 1') and the School Climate Index (called by us 'Attitude to School 2') designed by Finlayson. These aim to tap pupil perceptions of their school environment, of teacher behaviour, of peer group behaviour and of the 'tone' and flexibility of the school organisation. The first scale subdivides into two scales measuring school organisation and the second subdivides into four scales measuring emotional tone, task orientation, teacher concern and social control. The two tests have been widely used and are of demonstrated reliability. (Finlayson, 1970).

The second non cognitive area we attempted to tap was the pupils 'locus of control', a concept which refers to the degree to which individuals feel that they have personal control over the events that happen to them. Individuals who feel that their own behaviour is responsible for their success are said to hold an 'internal' locus of control - those who see life as being dependent upon luck, chance, fate or others actions are said to hold an 'external' locus of control. This construct has recently become extensively utilised as a means of explanation of differing pupil performance on a wide variety of academic and social 'outcomes' of education (see Lefcourt, 1976). We utilized the Intellectual Achievement Responsibility Questionnaire designed by Crandall and his associates in 1965 as our measurement of this construct - again, it is of 'moderate reliability' as described by its designers and has been extensively utilised, particulary in the United States of America, on pupils of age groups similar to our cohort.

It is important to appreciate that our attitude to school data and our locus of control data are, in a sense, 'process' data as well as measurements of the actual outcomes of the schooling systems. Given the extensive literature linking attitude to school and academic attainment (e.g. Banks and Finlayson, 1973) and linking, as with the Crandall (1965) study, locus of control and attainment, both these outcomes link with attainment. Also, given the likely impact of academic attainment upon pupil attitude to school and pupil perception of the wider social environment, the social outcomes may also be partly determined (in a process of interactive feedback) by the academic outcomes.

We noted earlier that there were some small differences in some of the ability and personality characteristics of the intakes into the two systems. Although it seemed unlikely that such small differences would have much effect in biassing the selective/comprehensive comparison in favour of the selective system because of its more academically advantaged intake, it was clearly necessary to statistically 'take out' the effect of the intakes upon the outcomes scores of the two systems.

We calculated, therefore, for the sample as a whole the relationship at an individual level between each intake measure and each outcome measure, whether academic or social. Interestingly, the tests where the comprehensive pupils and the selective pupils were performing at similar levels on intake (those measuring verbal ability) proved to have the best relationship with the outcomes - on mathematics and on the intelligence test, the relationships were considerably weaker.

The effect of his when we predicted, using the whole sample relationsips and all the intake measures in a multiple regression analysis, the outcome scores was then to generate predicted scores for the two systems that were very similar. (See Table 2). Looking at the residuals, however, it is clear that the comprehensive school pupils performed much worse on all the outcomes than one might have expected at age eleven, the disparity being marked on reading ability, very marked on locus of control and again marked on the first of the attitude scales relating to school organisation.

Table 2

Actual and Predicted Outcome Scores for Two Systems

	Selective		Comprehensive		Residuals	
	Actual	Predict.	Actual	Predict.	Sel.	Comp.
Age E.R.T.	100.26	95.62	94.50	96.88	+ 4.64	- 2.38
Att. to School 1	70.78	69.17	63.38	67.32	+ 1.61	- 3.94
Att. to School 2	55.98	55.82	54.28	54.35	+ .16	- 0.07
Locus of Control	24.14	20.27	17.86	19.85	+ 3.87	- 1.99

If we compare the difference of residual scores for the two systems with the spread of the scores as measured by the standard deviation to place the difference scores in some sort of perspective., it is clear that the reading score differences and the attitude scale 1 scores are reasonably small by comparison with the overall differences of the sample children when all are compared with each other. The locus of control difference scores, by the same comparison, indicate very marked system effects by comparison with the differences occuring amongst the children in the sample as a whole.

Table 3

Residuals and Standard Deviations

	Residuals		S.D.	
	Selective	Comprehensive	Selective	Comprehensive
Age E.R.T.	+ 4.64	- 2.38	14.51	17.008
Att. to School 1	+ 1.61	- 3.94	14.62	14.20
Att. to School 2	+ .16	- 0.07	12.52	13.64
Locus of Control	+ 3.87	- 1.99	3.80	4.37

It might be possible to argue that the comprehensive system's poorer performance was simply due to our not having adequately tapped the extent of the disadvantage of its intake at age eleven, due to the absence of data on the social characteristics of the individual pupils. However, inspection of 1971 census data on the social characteristics of the two system's catchment areas three years before our pupils entered their schools shows

virtually identical social conditions existed for both systems, as Table 4 shows. Whilst the selective system's catchment area is slightly more advantaged in terms of social class composition, if we look at the proportion of one parent families, household amenities and housing overcrowding, the comprehensive system is more advantaged. In view of this data, it is difficult for us to believe that the inclusion of social data on the individual pupils would have accounted for the comprehensive system's poor performance in ways that individual intellectual data does not.

Table 4

Catchment Areas of the Two Systems

	Selective	Comprehensive
Average Household Size	2.94	2.97
% pop. in social class one/two	9.7%	8.2%
% pop. in social class five	15.7%	16.2%
% households one parent families	8.6%	8.1%
% households lacking one or more amenity	57.6%	50.0%
% households overcrowded (more than one person per room)	5.7%	5.5%

Source: 1971 Census

Furthermore, there is no doubt that the limited range of individual intake data we possessed did actually explain a relatively high proportion of the variation in individuals' outcome scores. Taking our E.R.T. score as an example, the intake variables generated an R2 value of 0.62 for the relationship with the age adjusted reading scores that we have concentrated our analysis on. Looking at the recent studies of comprehensive and selective schools summarised in Cox and Marks (1983), we are actually explaining a very similar amount of variance in outcomes to these other major studies - Steedman (1983) has an R2 value of 0.80 for a combintion of seven intake variables against academic outcomes, Cox and Marks (1983) have a value of 0.85 for five input variables against examination attainments and the Department of Education and Science (1983) gives values of 0.77 for six input variables against high examination atcainments. Again, it eems highly unlikely that the

comprehensive system's poorer performance is due to intake factors that we have not measured actually affecting its performance.

Group Outcome Data

This was collected on the enture cohort of pupils in their fourth year and covered their delinquency and their attendance at school. In order to see if any differences in these social outcomes was produced by differences in the social background of the pupils entering the schools, data was used from the 1971 Census on social conditions in the catchment areas of the two comprehensives and of the selective system.

Looking at delinquency first, defined as a guilty court finding or an official caution, the comprehensive system generated 43 delinquents in total, out of 227 pupils, a rate of 18.9%. The selective system generated 10 offenders out of 101 pupils, a 9.9% rate. Also, it is important to note that whilst the selective system generated only ten offences by its ten offenders over the four years 1974-1978, the comprehensive system actually generated seventy three offences by its forty three offenders.

On attendance. the comprehensive system's poorer performance is again marked. Using the attendance rates on fourth year pupils for an entire academic year calculated from form registers, the two comprehensive schools achieved rates of 75.2% and 61.2% respectively for their 113 and 114 sample pupils. The selective system - weighted for the differences in the number of pupils going to the three schools - achieved a rate of 78.8%, some ten per cent above the mean for the two comprehensive schools. The rate for the grammar school pupils (42) was 81.2%and that for the secondary modern school pupils was 79.4% (29 pupils) and 74.7% (30 pupils). In our survey, then, the two secondary modern schools together were actually outperforming the comprehensive system. Inspection of our range of census data on social conditions in the catchment areas of the two systems does not suggest that these factors were responsible for these differences. Table 4 above showed this data for the two systems.

Again, it is simply very difficult to believe that the comprehensive system's slight excess proportion in social class five, or its slightly lower proportion of population in social class one could account for its

inferior performance, particularly since it appears to be less socially deprived in its proportion of one parent families, its housing conditions and its overcrowding rate. There is also nothing in the available literature to suggest that the minor differences in the personality and ability scores of the pupil intakes could - even together with the social background data above - explain more than a small proportion of the difference between the systems in these social or 'affective' outcomes. These differences we believe are completely due to school system effects.

So far, then, we have seen that the large differences between the two systems in their outcomes in terms of reading ability, attitudes to school and pupil perception of their personal power in affecting the wider environment are not explicable by the minor differences in the personality and ability of the pupils when they entered the systems four years earlier. Differences in the social background of the pupils gauged by the census data seen to be minimal, and neither the individual data nor the census data would seem able to explain the large differences in the two system's performance on our social outcomes of delinquency and attendance. Whilst the differences in reading ability are not trivial in size, it is the differences in the social outcomes of delinquency, attendance, attitudes to school and locus of control that seem to be particularly marked.

With Which Pupils Do Comprehensive's Fail?

It is important for us now to consider which parts of the ability range the comprehensive school is failing to develop in both social and affective areas. Whereas the national discussion of this issue has almost uniformly concentrated upon whether high ability pupils are being adequately served in the comprehensive schools as they have purportedly been before in the selective system (eg. Stevens, 1980), our data in this study leads us toward very different conclusions about which portion of the ability range has been in this sense 'uneducated'.

For our analysis of different ability bands experiences in the schools, we have split the entire population of 328 pupils into three ability bands - band A, (containing 128 pupils and representing the grammar school and the equivalent forms within the comprehensives) band B, (110 pupils representing the middle of the comprehensive ability range and the top

or 'A' streams in the secondary moderns) and band C, (90 pupils representing the 'B' streams of the secondary moderns and the bottom third of the comprehensive's ability range). Band A children were seen as potentially examination candidates in a range of subjects. Band B were viewed as candidates in perhaps three to five subjects each, often at C.S.E. level. Band C children were only seen as examination material in perhaps one, two or (most likely) in no subjects.

Band one represented 41% of selective children and 38% within the two comprehensives - band three, by contrast, covered 27% of selective children and 28% of comprehensive children.

In order to assess the overall balance of advantage to the selective system in performance, we calculated a score for each of the outcome measures that reflects the difference between the two systems in their performance (ie. selective actual minus predicted, minus comprehensive actual minus predicted). Results can be seen in Table 5 for each ability band.

Table 5

Outcome Results by Ability Band - Selective Advantage Over Comprehensive

	ERT	Locus of Control	Attitude	Attitude
Band 1 (128 pupils)	+4.44	+4.04	+6.15	- .92
Band 2 (110 pupils)	+4.70	+7.31	+10.18	- 4.17
Band 3 (90 pupils)	+3.43	+6.75	-2.17	- 3.75

Overall, it must be clear that the differences between the systems in their performance with the different ability bands are quite marked. The comprehensive's worst performance is with the middle ability bands, where their deficit on reading, locus of control and the two attitude scales is greatest. The comprehensive's performance with the high ability pupils is mixed - poor on reading, relatively good on the locus of control scale and a performance on the two attitude scales that is intermediate between that of the other two ability ranges. The comprehensive's performance with the lower part of the ability rangeis also mixed - relatively good on reading ability, relatively good on the attitude scales where on both of them the

comprehensives actually out perform the selective system and quite poor on the locus of control scale. The small numbers that are in the different groups in the individual five schools, the possible effect of 'outlier' or extreme scores upon these system means and the usual effects of pupils errors should all be kept in mind when assessing the possible significance of these findings.

We have two further sets of data that enable us to assess which part of the ability range was responsible for the failure of the comprehensive system in its general levels of effectiveness - that on the attendance rate of one of the comprehensives, the grammar school and one of the secondary moderns analysed by individual form, and that on the distribution of delinquency through the ability range by the end of the schooling process that the pupils had undergone. To look at delinquency first, the selective system was notable for the relatively even spread of offenders through the ability range - four (out of forty two) were at the grammar and six (out of fifty nine) were in the other two thirds of the ability range. In the two comprehensive schools, the bottom two thirds of the ability range generated thirty four (out of forty three) offenders, a proportion higher than the distribution of pupil numbers would have suggested to be likely. In view of small numbers it seems inadvisable to undertake a more detailed analysis of the two lower ability bands.

Our last piece of information, as we noted earlier, is on the detailed attendance rates of pupil in classes of two of the three selective schools and in one of the comprehensives. The comprehensive obtained 84.5% attendance with its top band pupils in the Christmas Term of their fourth year - the grammar obtained 85.4% with its top band pupils. For middle band pupils, the comprehensive obtained 66.4% for the same time period, whereas the top band of the secondary modern obtained no less than 91.5% attendance. For the bottom band comprehensive pupils, the figure obtained was 49.2% - the secondary modern school obtained a figure of 83.4% for comparable pupils, an overperformance of about 25% to 35% for both the bottom two ability bands.

Conclusions

We have presented a large amount of data in this chapter which we should now summarise in point fashion:-

1. The comprehensives and the selective system are receiving pupils of similar ability and personality at age eleven, taken from very similar social backgrounds.

2. Statistical adjustments for the slightly superior intellectual quality of the selective system's intake do not dispose of the large differences in the academic and social outcomes from the two systems.

3. These differences seem to be marked in the areas of delinquency, attendance and in the locus of control of the pupils. They seem to be less marked in the areas of verbal ability and in attitudes to school.

4. The comprehensive schools' poor performance is due - looking at the individual data - to particularly poor results with the middle third of the ability range who in the selective system attended the top streams of the secondary modern schools. Performance with the top and bottom third of the ability range is more mixed.

5. Looking at our group data, it is the bottom two-thirds of the ability range that can be assessed as being responsible for the comprehensive's poor performance on delinquency and the bottom third of the ability range that does particularly poorly on attendance. The comprehensive system holds, by contrast, the performance of the higher ability children to attendance and delinquency levels similar to those of the selective system's grammar school.

School Processes within the Two Systems

We will attempt in this section two main tasks. Firstly, we will try to explain how the social outcomes of the comprehensive system came to be worse than its academic and secondly we will try to explain why the ineffectiveness of the comprehensive system is particularly marked with the bottom two-thirds of the ability range. The information on within system processes was collected by

a participant observer prior to any analysis of the data on the outcomes of the schools. Full information on this area of the study is available elsewhere (Reynolds and Sullivan, 1979, 1982; Reynolds, Sullivan and Murgatroyd, 1987).

The within system factors seem to be:

(i) The new comprehensives had difficulty in generating a consistent staff response early in their existence because of the fragmentation of staff groups. The process of 'comprehensivisation' generated friction in the allocation of new jobs in the schools and in inadequate arrangements for the change.

(ii) The comprehensives larger size had adverse effects on outcomes because of their continuance of traditional centralised management procedures, the lack of mechanisms to ensure staff cohesion, and the resulting heterogeneity of pupil expectations, teacher goals and teacher behaviour.

(iii) The comprehensives de-emphasised the importance of pastoral care by comparison with maintaining academic standards, and also introduced highly bureaucratic procedures which involved the use of a referral system from front line, class teachers up to specialist guidance staff, a procedure which led to the front line staff de-emphasising their pastoral roles.
The 'professionalising' of pastoral care was paralleled by the comprehensive system's tendency to deal with its problem pupils by the use of outside specialist personnel, which led to a reduction in the amount of energy that the school utilised in its own dealings with these pupils.

(iv) The comprehensive system was more distant in its relations with parents than the selective system, and took less trouble to involve them in the educational life of schools.

(v) The comprehensive system when faced with social problems amongst its pupils reacted by tightening its rule enforcement procedures, generating alienation amongst lower stream pupils.

(vii) The comprehensives, since they perceived themselves as being

seen as a threat to academic standards, elevated academic goals to primacy above the attainment of social goals. This had particularly unfortunate results with the bottom portion of the ability range who, in the selective system, attended schools which gave the attainment of social goals primacy.

The Implications of the Study for School Effectiveness Research and Practice

The early years of school effectiveness research in Britain generated a 'paradigm' or set of beliefs about the effects of schools and the explanations for those effects which has in recent years come under question as the 'second wave' of research from Gray et al (1983), the Scottish Education Data Archive (e.g. Willms and Cuttance, 1985; Willms, 1986) and the Inner London Education Authority (Mortimore et al, 1986) generated different sets of findings.

In general, the early work suggested the following:

1. That schools had substantial effects upon pupil outcomes (Power, 1967; Gath, 1977; Reynolds, 1976, 1980; Rutter et al, 1979).

2. That schools had a uniform effect across different types of outcome whether academic or social. Both Rutter et al (1979) and Reynolds (1976) report intercorrelations of higher than 0.6 between the three outcomes of delinquency, attendance and academic attainment.

3. That schools were consistently effective or ineffective for pupils of different ability ranges (see reviews in Reynolds, 1982 and Rutter, 1983).

The later work directly contradicted these early findings in many areas. This second body of knowledge which emerged from the early 1980s to date suggests that by contrast:

1. School effects may be much smaller than had been previously thought. Willms (1986) reports that the amount of additional variance in academic outcomes explained by schools over and above that explained by school mean socio economic status was 2%. Gray et al (1986) report very small differences between schools in examination performance, once intakes have been statistically accounted for. Galloway (1985)

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